REMARKS

This paper is filed in response to the final office action mailed on February 25, 2004. No claims have been canceled. Claims 1-2 and 4-14 remain pending.

The office action objects to the specification and abstract. In response, clarifying amendments have been made to both the specification and a new abstract is provided. All such amendments are supported by the drawings as filed. No new matter is added thereby.

The claims are also objected to as well as rejected under 35 U.S.C. § 112, second paragraph. In response, clarifying amendments have been made so that the claims clearly describe the inventive process illustrated in Figs. 3A-3E. Again, no new matter is added thereby.

It will be noted that all suggestions made by the examiner regarding the specification and claims have been incorporated into the amended specification and claims and the examiner's comments are greatly appreciated.

Turning to the rejections based upon the prior art, claims 1-2, 4-5 and 9-14 stand rejected under 35 U.S.C. § 103 as being unpatentable over Lin '632 in view of Lin '999. Claim 1 has been amended to traverse this rejection.

Applicants respectfully submit that this rejection does not meet the standards required for establishing a *prima facie* case of obviousness as set forth in §§ 2142, 2143 of the MPEP:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. MPEP §§ 2142, 2143.

The base reference, Lin '632, does not teach or suggest leaving only a portion of a second etching stop layer that surrounds the inlet of its respective opening 12b as more clearly recited in amended claim 1. As shown in Fig. 7 of Lin, the etching stop

layer 10b is etched together with the silicon oxide layer 13 beyond the inlet of the via opening 12b which extends through the oxide or insulating layer 4. As shown in Fig. 6 of Lin '632, after formation of the insulating layers 4 and 13 and the silicon islands 10b, an etching process for forming the openings 15b and 12b is carried out resulting in the islands 10b and the insulating layer 13 are clearly set back from the inlet of the via 12b.

The process illustrated in Figs. 6-8 of Lin '632 will result in the underlying insulating layer 4 being etched or eroded during the subsequent etching process as illustrated in Fig. 2B of the present application. By not leaving a portion of an etching stop layer surrounding the via 12b, the layer 4 of Lin '632 will clearly be eroded, a problem claim 1 avoids.

In contrast, claim 1 recites that the via hole to be formed by selectively etching the second etching stop layer and the third interlayer insulating layer (optionally using a photoresist layer as set forth on page 6, line 9 of the present application; see also dependent claim 2) to preserve a portion of the second etching stop layer around the inlet of the via hole. Then, claim 1 recites that an etching stop pattern to be formed around the inlet of the via hole by selectively etching the second etching stop layer thereby leaving a portion of the second etching stop layer around the inlet of the via hole and also exposing a portion of the third interlayer insulating layer as illustrated in Fig. 3C. Lin '632 does not teach or suggest this methodology.

Also, claim 1 requires the formation of a fourth interlayer insulating layer on the portion of the second etching stop layer disposed around the inlet of the via hole and the exposed portion of the third interlayer insulating layer. Lin '632 does not each or suggest this methodology because its islands 10b are never selectively etched to expose a portion of the layer 4 thereby leaving a portion of the island 10b around the via 12b. Clearly, as shown in Lin '632, the islands 10b are spaced radially outward from the inlet of the via 12b.

It then appears that the Patent Office is relying upon Lin '999 for the proposition of a forming an etching stop pattern around the inlet of a via hole. The Patent Office refers to Figs. 2b and 2f of Lin '999. However, the technique disclosed in Lin '999 does not teach or suggest the forming of an etching stop pattern around the inlet of a via hole by selectively etching the second etching stop layer leaving a portion of the etching stop layer around the inlet of the via hole and an exposed

portion of the underlying third interlayer insulating layer as recited in amended claim 1. By leaving the entire etching stop layer 120 in place (with the exception of the via hole 145), this results in the capacitance increase which is a primary problem addressed by the present application as set forth on page 4, lines 28-33 and thereafter. Thus, the combination of Lin '999 and Lin '632 actually teaches away from the solution provided by amended claim 1.

Therefore, the hypothetical combination of Lin '632 and Lin '999 does not teach or suggest all of the claim limitations of amended claim 1 and therefore does not fulfill the requirements of §§ 2142, 2143. Further, Because Lin '632 teaches formation of its islands 10b so early in the process, prior to the formation of the trench 12a, and further because Lin '999 does not teach or suggest the formation of an etching stop pattern around the inlet of the via hole using an etching stop layer. Further, the proposed hypothetical combination of the two Lin references teaches away from the solution provided by amended claim 1.

Therefore, applicants respectfully submit that the rejection of claims 1-2, 4-5 and 9-14 under 35 U.S.C. § 103 as being unpatentable over Lin '632 and Lin '999 is improper and should be withdrawn.

Finally, claims 6-8 stand rejected under 35 U.S.C. § 103 as being unpatentable over Lin '632, Lin '999 and Huang. The deficiencies of the two Lin patents are discussed above.

In response, claim 6 has been amended to clarify the fact that the void is formed in the fourth interlayer insulating layer as illustrated by the reference letter B in Fig. 3D. Huang does not teach or suggest any such void in its cap layer 106 and therefore the obviousness rejection of these claims based upon Lin '632, Lin '999 and Huang has respectfully been traversed.

Applicants respectfully submit that all rejections and objections have been addressed and that this application is in a condition for allowance and an early action so indicating is respectfully requested.

The Commissioner is authorized to charge any fee deficiency required by this paper, or credit any overpayment, to Deposit Account No. 13-2855.

Respectfully submitted,

MARSHALL, GERSTEIN & BORUN LLP
6300 Sears Tower
233 South Wacker Drive
Chicago, Illinois 60606-6357
(312) 474-9577

April 26, 2004 By: _____

Michael R. Hull
Reg. No. 35,902